



MS APPEAL BRIEF - PATENTS
Docket No.: 0142-0327P
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
DOORN, VAN et al.

Application No.: 09/635,798

Confirmation No.: 9236

Filed: August 11, 2000

Art Unit: 2861

For: A METHOD OF PRINTING A SUBSTRATE
AND A PRINTING DEVICE SUITABLE FOR
USE OF THE METHOD

Examiner: T. H. Nguyen

AMENDED APPEAL BRIEF TRANSMITTAL FORM

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Transmitted herewith is an Amended Appeal Brief on behalf of the Appellants in connection with the above-identified application.

The enclosed document is being transmitted via the Certificate of Mailing provisions of 37 C.F.R. § 1.8.

A Notice of Appeal was filed on March 23, 2005.

Applicant claims small entity status in accordance with 37 C.F.R. § 1.27.

The fee has been calculated as shown below:

Extension of time fee pursuant to 37 C.F.R. §§ 1.17 and 1.136(a) - \$120.00.

- Fee for filing an Appeal Brief - \$500.00 (large entity).
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If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Dated: November 23, 2005

Respectfully submitted,

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AMENDED APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

November 23, 2005

Sir:

This Amended Brief is timely filed in reply to the Notification of Non-Compliant Appeal Brief.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1206:

- I. Real Party In Interest
- II. Related Appeals and Interferences
- III. Status of Claims
- IV. Status of Amendments
- V. Summary of Claimed Subject Matter
- VI. Grounds of Rejection to be Reviewed on Appeal
- VII. Argument
- VIII. Claims
- IX. Evidence
- X. Related Proceedings
- Appendix A Claims
- Appendix B Evidence (Blank)
- Appendix C Related Proceedings (Blank)

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

OCÉ-TECHNOLOGIES B.V.

II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 6 claims pending in application.

B. Current Status of Claims

Claims 1-6 stand rejected by the Examiner under 35 USC 102(b) as being anticipated by Hackleman, U.S. Patent 5,640,183. Thus, claims 1-6 are presently pending and are the subject matter of the present appeal.

C. Claims On Appeal

The claims on appeal are claims 1-6

IV. STATUS OF AMENDMENTS

Applicant filed a Request for Reconsideration after the Final Rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

General Summary

In general, the present invention is directed to a method and apparatus for printing a substrate with an inkjet printing device comprising a first printing stage in which a strip of pixel

rows is provided with ink drops, whereafter the print head is displaced in a direction substantially parallel to the pixel columns, and a second printing stage in which the strip is provided with supplementary ink drops, wherein the print head is displaced over a distance which is not selected from a plurality of distances but which is a fixed distance such that the same is always substantially equal to the width of one pixel row.

According to the present invention, it has been found that the negative effect on printing results induced by distributed faulty nozzles can be more adequately masked by applying a fixed displacement of the print head instead of using a displacement that has to be chosen for each subsequent print swath. Thus, in the method and apparatus of the present invention, the distance over which the print head is displaced before the next print swath is made is not selected out of a plurality of distances but is a fixed distance that is determined, that is, is predetermined even before the printing starts.

Surprisingly, the Appellants have found that the negative effect on printing results induced by distributed faulty nozzles can be more adequately masked by applying a fixed displacement of the print head instead of using a displacement that has to be chosen for each subsequent print swath. In other words, the selection of the position occupied by a second and any following print head is no longer a random choice but is made with a fixed displacement over a distance equal to the width of one pixel row. It has been found that this gives better masking of any printing fault as a result of a deviation of a nozzle. This method is based on the realization that systematic deviations of the nozzles can be masked more satisfactorily by a systematic distribution of the printing faults due to such deviations, rather than is possible with a random distribution of the printing faults. The systematic principle associated with these deviations is that each nozzle always ejects ink drops in the same way. In other words, if a

special nozzle results in ink drops being ejected at a deviant angle, whereby the ink drops are printed at a place deviating from the normal position of a location, said nozzle will always eject the ink drops at the same deviant angle. For the reason for this, although not entirely clear, may be that the angle at which an ink drop is ejected is significantly determined by the shape and direction of each nozzle, which are subsequently invariable in time. Due to the presence of this systematic deviation, it is not necessary to distribute any faults in nozzles at random over the substrate. On the contrary, by making use of the systematic deviation of each nozzle, it is possible to obtain better masking of printing faults. One important advantage of the method and apparatus of the present invention is that the shift of the print head no longer has to be chosen at random but one fixed shift is adequate. This means that the paper transport does not have to meet such stringent requirements. It is also possible to use the full length of a row of nozzles in printing a strip of the substrate, because no extra nozzles are required to make a random shift possible. The result of the application of the method and apparatus according to the present invention is that ink drops originating from a specific nozzle are not situated next to one another in one pixel row, with the result that any fault is propagated in a complex pixel row. When using the present method and apparatus, a pixel row contains ink drops originating from different nozzles. In this way, possible faults do not propagate in a complete row. Depending on the printing strategy used, the ink drops originating from one individual nozzle are, for example, situated in pairs, one beneath the other, distributed over a number of pixel columns. Printing faults due to a deviation of this specific nozzle are thus uniformly distributed over the substrate.

Detailed Summary

In more detail, Claim 1 is directed to a method of printing a substrate (2) with ink

drops, image-wise, utilizing an inkjet printing device, (shown in Fig. 1, see page 5 of the specification, lines 1-28), containing at least one print head (3) provided with at least one row of nozzles (nozzle rows shown in Fig. 1 and described on page 5, lines 1-28), said substrate (2) forming a regular field of pixel rows and pixel columns (shown, for example, in Figs. 2a through Fig. 8, and from page 5, line 29 to page 9, line 23), the resolution of the pixel columns (shown, for example, in Figs. 2a through Fig. 8) being equal to the resolution of the row of nozzles (shown in Fig. 1), which comprises: (a) initiating a first printing stage in which a strip of pixel rows (a strip of pixel rows making up a pixel column, as shown, for example, in Figs. 2a and 2b) is provided with ink drops (as described, for example on page 6, second paragraph, with reference to Fig. 3a, for example), (b) whereafter the print head (3) is displaced in a direction substantially parallel to the pixel columns (as described, for example on page 6, second paragraph, with reference to Fig. 3a, for example) , and (c) initiating a second printing stage (Fig. 3, page 6, line 14 to page 7, line 2) in which the strip is provided with supplementary ink drops, wherein the print head is displaced over a distance which is not selected from a plurality of distances but which is a fixed distance such that the same is always substantially equal to the width of one pixel row (described, for example, in the paragraph bridging pages 6 and 7 and shown, for example, in Fig. 3c, and described in the first full paragraph on page 7, and as shown, for example, in Figs. 4a through 4c).

Claim 2 is directed to a method according to claim 1, wherein one extra nozzle is added to the row of nozzles (as described, for example, on pages 7 and 8, and shown in Figs. 5a-5b and 6a-6d).

Claim 3 is directed to a method according to claim 1, wherein the row of nozzles used in the first printing stage differs from the row of nozzles used in the second printing stage (see, for example, pages 6-9 and Figs. 2a through 8).

Claim 4 is directed to a method according to claim 1, wherein the print head used in the first printing stage differs from the print head used in the second printing stage (see, for example, Figs. 7 and 8 and their description on pages 8 and 9 of the specification).

Claim 5 is directed to a method according to claim 1, wherein substantially each pixel is printed with no more than one ink drop.

Claim 6 is directed to an apparatus that is capable of performing the steps recited in claim 1 and is described at the same portions of the specification and in the same figures as is claim 1. Additionally, the means for performing the steps is inherently shown in the apparatus of Fig. 1

Moreover, claim 6 is directed to an apparatus for printing a substrate with ink drops, image-wise, which comprises (a) an inkjet printing device (Fig. 1 – page 5 of the specification, lines 1-28) containing at least one print head (3) provided with at least one row of nozzles (see Fig. 1 and page 5 of the specification, lines 28), (b) said substrate forming a regular field of pixel rows and pixel columns, the resolution of the pixel columns being equal to the resolution of the row of nozzles (see Figs. 2a through Fig. 8 and the specification, page 5, line 29 to page 9, line 23), (c) means for initiating a first printing stage (Figs. 2a and 2b) in which a strip of pixel rows

is provided with ink drops, said print head being displaced in a direction substantially parallel to the pixel columns (page 6 of the specification, lines 1-4), and (d) means for initiating a second printing stage (Fig. 3, page 6, line 14 to page 7, line 2) in which the strip is provided with supplementary ink drops, wherein the print head is displaced over a distance which is not selected from a plurality of distances but which is a fixed distance such that the same is always substantially equal to the width of one pixel row (Figs 4a, 4b and 4c, page 7, lines 3-20 of the specification) .

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1 and 6 stand rejected by the Examiner under 35 USC 102(b) as being anticipated by Hackleman, U.S. patent 5,640,183.

The Examiner believes that the printing method recited in claim 1 and the corresponding printing apparatus recited in claim 6, as well as dependent claims 2-5, are anticipated by Hackleman.

With respect to claims 1 and 6, the means for/step of initiating a first printing stage is allegedly disclosed at col. 4, line 15 of Hackleman.

With respect to claims 1 and 6, the means for/step of displacing the print head in a direction substantially parallel to the pixel columns is allegedly disclosed in col. 2 of Hackleman.

With respect to claims 1 and 6, the means for/step of “initiating a second printing stage in which the strip of pixel rows is provided with supplementary ink drops, wherein the print head is displaced over a distance which is not selected from a plurality of distances but which is a fixed distance such that the same is always substantially equal to the width of one pixel printing stage” is allegedly disclosed by Hackleman in col. 5, lines 1-23 where, according to the rejection, “the

one pixel row width can be selected as any non-random value e.g., 0, 1, 1, . . . , n. As best understood, the one pixel row width according to one strip paper drive remained fixed until the completion of the printing page once the choice is selected) such that the same is substantially equal to the width of one pixel row.”

With respect to claim 2, the claimed extra nozzle is allegedly shown in Fig. 5.

With respect to claim 3, which recites that the row of nozzles used in the first printing stage differs from the row of nozzles used in the second printing stage, and with respect to claim 4, wherein the print head used in the first printing stage differs from the print head used in the second printing stage, the rejection relies on Fig. 4, and the text from col. 3, line 64 to col. 4, line 18, to anticipate these claimed features.

With respect to claim 5, the feature of substantially each pixel being printed with no more than one ink drop is alleged disclosed in col. 3, lines 51-54

ARGUMENT

During patent examination the PTO bears the initial burden of presenting a *prima facie* case of unpatentability. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444(Fed. Cir. 1992); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788(Fed. Cir. 1984). This burden can be satisfied when the PTO presents evidence, by means of some teaching, suggestion or inference either in the applied prior art or generally available knowledge, that would have appeared to have suggested the claimed subject matter to a person of ordinary skill in the art or would have motivated a person of ordinary skill in the art to combine the applied references in the proposed manner to arrive at the claimed invention. See Carella v. Starlight Archery Pro Line Co., 804 F.2d 135, 140, 231 USPQ 644, 647 (Fed. Cir. 1986); Ashland Oil, Inc. v. Delta

Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); In re Rinehart, 531 F.2d 1048, 1051-1052, 189 USPQ 143, 147 (CCPA 1976).

If the PTO fails to meet this burden, then the applicant is entitled to the patent. However, when a *prima facie* case is made, the burden shifts to the applicant to come forward with evidence and/or argument supporting patentability. Patentability vel non is then determined on the entirety of the record, by a preponderance of evidence and weight of argument, *Id.*

A prior art reference anticipates the subject matter of a claim when that reference discloses every feature of the claimed invention, either explicitly or inherently. In re Schreiber, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997) and Hazani v. Int'l Trade Comm'n, 126 F.3d 1473, 1477, 44 USPQ2d 1358, 1361 (Fed Cir. 1997). While, of course, it is possible that it is inherent in the operation of the prior art device that a particular element operates as theorized by the examiner, inherence may not be established by probabilities or possibilities. In re Oelrich, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981) and In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993).

Appellants respectfully submit that claims 1 and 6 are not anticipated by U.S. Patent 5,640,183 to Hackleman.

Hackleman recites a combination of features including a step of initiating a second printing stage in which the strip is provided with supplementary ink drops, wherein the print head is displaced over a distance which is not selected from a plurality of distances but which is a fixed distance such that the same is always substantially equal to the width of one pixel row.

Hackleman discloses optional swath offsets, i.e., either random offsets or non-random offsets. By doing this, Hackleman does not displace the print head over a distance . . . which is

always substantially equal to the width of one pixel row. If one has a choice of a random swath offset or a non-random offset, then swath offset cannot always be fixed as being substantially equal to one pixel row. Thus, in the method and apparatus of the present invention, the distance over which the print head is displaced before the next print swath is made, is not selected out of a plurality of distances but is a fixed distance that is determined, that is predetermined even before the printing starts.

Moreover, Hackleman can be used in a single drop per pixel mode or, as in Hickman (4,963,882), in a multiple drop per pixel mode (col. 3, lines 51-54). If one has a choice of a single drop per pixel mode or a multiple drop per pixel mode, then swath offset cannot always be fixed as being substantially equal to one pixel row.

For these reasons alone, Hackleman does not anticipate claim 1 or claim 6.

According to the present invention, it has been found that the negative effect on printing results induced by distributed faulty nozzles can be more adequately masked by applying a fixed displacement of the print head instead of using a displacement that has to be chosen from each subsequent print swath. It is believed that the Examiner is wrongly interpreting the teachings of the Hackleman patent which is apparent from the Examiner's response to the arguments filed by the Appellants and submitted to the U.S. Patent & Trademark Office on March 15, 2004. In the Examiner's Office Action, in the paragraph entitled "Response to Argument", the Examiner states that the Hackleman patent defines displacement (paper drive) that is fixed when a swath is printed in a normal mode (i.e., zero offset) or to have an offset by "n" dots. The Examiner then states that the offset remains to be fixed "swath after swath" with the choice selected to complete the page as necessary. Apparently, the Examiner assumes that in the non-random mode, the offset remains fixed, "swath after swath", when completing a page. However, this is not the

case. If this would be true, this would automatically mean that the same set of nozzles is used to print adjacent swaths. However, the Hackleman patent leaves no doubt that this is not the case. Please see for example, the Abstract of the Disclosure of the Hackleman patent which states that: "In operation, the print head is shifted regularly or pseudo-randomly such that a different set of nozzles print adjacent swaths". Thus, it is clear that the Hackleman patent teaches to select a new set of nozzles after each print swath, not only when the shift is random, but also when the shift is non-random, that is, regular. This is expressed very explicitly by the Hackleman patent in column 5, lines 11-15 where it is stated that "in order to minimize the effect that any defective nozzle may have on the printed image, the offset for each swath is decided upon 603". The methodology for offset selection may be non-random, for example, offset = 0, 1, 2, 3, 0, 1, 2, 3, 0, 1... or pseudo-randomly selected.

To one skilled in the art, the discussion in the Hackleman patent as set forth hereinabove, leaves no doubt that in the random mode as well in the non-random mode, for each swath, a new selection for the offset is made.

As is apparent from the Examiner's rejection, the Examiner understands from the Hackleman patent that there are two options for shifting:

1. randomly, for every swath a new offset is selected for the shift;
2. non-randomly, for every swath in a page, the same offset is used, being either 0 or 1 or 2, etc.

This explains the Examiner's position, but given the explanation provided hereinabove, it is clear that the Examiner's understanding is incorrect. The meaning of a non-random shift is that the shift is altered between swatch via a regular series. Proof for this is given in column 5, where an example is given of a non-random selection for the offset: 0, 1, 2, 3, 0, 1, 2, 3, 0, 1, etc.

If the Hackleman patent intended that the non-random shift was a fixed shift, being either always 0 or always 1 or always 2 or always 3, then the patentees would clearly not have given the repeating progression in line 14 of column 5, but would have given only the choices 0, 1, 2, 3, ... n etc., without any kind of repetition (like the Examiner does in his interpretation of Hackleman on page 3, line 5 of the Office Action). Accordingly, to one skilled in the art, it is absolutely clear that the Hackleman patent teaches to make a new selection for the offset after every swath, wherein the selection is chosen either randomly or non-randomly. This is in complete contrast with the present invention wherein the offset for every second swath is a fixed offset.

Furthermore, with respect to claim 4, Hackleman does not disclose using plural print heads such that the print head used in the first printing stage differs from the print head used in the second printing stage. The portion of Hackleman that is supposed to disclose this feature is the text from col. 3, line 64 to col. 4, line 18. However, that text merely refers to double passes by a single print head, not one print head for a first printing stage and a second print head for a second printing stage.

Accordingly, it is believed that claims 1-6 are not anticipated by Hackleman. In other words, clearly establish a patentable contribution over the Hackleman patent and thus the Board of Appeals is respectfully requested to reverse the Examiner's rejection of claims 1-6 under 35 USC 102(b) as being anticipated by the Hackleman patent.

CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A do include all amendments filed by Applicants.

EVIDENCE

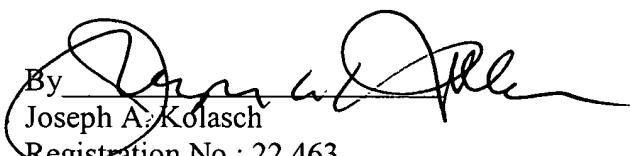
No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

RELATED PROCEEDINGS

No related proceedings are referenced in II. above, or copies of decisions in related proceedings are not provided, hence no Appendix is included.

Dated: November 23, 2005

Respectfully submitted,

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APPENDIX A

Claims Involved in the Appeal of Application Serial No. 09/635,798

1. A method of printing a substrate with ink drops, image-wise, utilizing an inkjet printing device containing at least one print head provided with at least one row of nozzles, said substrate forming a regular field of pixel rows and pixel columns, the resolution of the pixel columns being equal to the resolution of the row of nozzles, which comprises

- initiating a first printing stage in which a strip of pixel rows is provided with ink drops,
- whereafter the print head is displaced in a direction substantially parallel to the pixel columns, and
- initiating a second printing stage in which the strip is provided with supplementary ink drops, wherein the print head is displaced over a distance which is not selected from a plurality of distances but which is a fixed distance such that the same is always substantially equal to the width of one pixel row.

2. The method according to claim 1, wherein one extra nozzle is added to the row of nozzles.

3. The method according to claim 1, wherein the row of nozzles used in the first printing stage differs from the row of nozzles used in the second printing stage.

4. The method according to claim 1, wherein the print head used in the first printing stage differs from the print head used in the second printing stage.

5. The method according to claim 1, wherein substantially each pixel is printed with no more than one ink drop.

6. An apparatus for printing a substrate with ink drops, image-wise, which comprises an inkjet printing device containing at least one print head provided with at least one row of nozzles,

 said substrate forming a regular field of pixel rows and pixel columns, the resolution of the pixel columns being equal to the resolution of the row of nozzles,

 means for initiating a first printing stage in which a strip of pixel rows is provided with ink drops, said print head being displaced in a direction substantially parallel to the pixel columns, and

 means for initiating a second printing stage in which the strip is provided with supplementary ink drops, wherein the print head is displaced over a distance which is not selected from a plurality of distances but which is a fixed distance such that the same is always substantially equal to the width of one pixel row .